TAXONOMIC REVISION OF PIPTOCOMA CASS. (COMPOSITAE: VERNONIEAE)

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Piptocoma Cass. (Compositae: Vernonieae) is a small genus of shrubs distributed in the West Indies from Hispaniola eastward to the island of Virgin Gorda (Figure 1). The genus has traditionally been maintained as separate from *Vernonia* Schreb. on the basis of pappus and anther characters, and from *Pollalesta* H.B.K. on the basis of achene characters (Bentham & Hooker, 1873; Engler & Prantl, 1894). *Piptocoma* is usually considered to be closer to *Pollalesta* than to *Vernonia* (Bentham & Hooker, 1873; Engler & Prantl, 1894).

The genus was first described by Cassini in 1817; however, the type species, *Piptocoma rufescens,* was not published until 1818. In 1825, Sprengel applied the name *Eupatorium domingense* to this same species. Lessing (1829) named a new species from Brazil, *P. lychnophoroides,* which is now known as *Lychnophora trichocarpha* Spreng. In 1863, Shultz-Bipontinus transfered *P. rufescens* Cass. to the genus *Oliganthes* Cass. with the resultant change of name to *O. rufescens* (Cass.) Sch.-Bip. New World species formerly assigned to the genus *Oliganthes* are now considered to belong to the genus *Pollalesta* (Aristeguieta, 1963; Stutts, In press).

Gleason (1919) described a second taxon in the genus, *Piptocoma rufescens* var. *latifolia.* Urban (1931) described a new species, *P. antillana.* Liogier (1968, 1971) named three new species, these being *P. samanensis, P. dentata,* and *P. ekmanii.* The name *P. subscandens* Urban & Ekman was found on several herbarium sheets referable to *P. samanensis* Liogier but no literature citation was found, therefore it is considered to be a nomen nudum.

This revision of *Piptocoma* was done in connection with a recent revision of *Pollalesta* H.B.K. (Stutts, In press). The treatment presented here is based primarily on morphological characters supplemented by palynological and chemosystematic data. No living material was available for cytological analysis.

Herbarium specimens were borrowed from the following herbaria: B, BM, F, G, GH, K, M, MO, NY, S, UC, and US. Analysis of numerous morphological characters showed that certain features are diagnostic of the various taxa. These characters are inflorescence type, achene

length/width ratio, number of florets per head, and various leaf characters.

Pollen samples were removed from selected specimens of each taxon and acetolized by the procedures of Erdtman (1966). The grains were examined utilizing both light microscopy and scanning electron microscopy. All taxa were found to have essentially identical pollen grains of a subechinolophate, triporate type with prominent spines, being ca. 45–50 μm in diameter, spine tip to spine tip. This type of pollen grain is refered to as Vernonieae type A and is considered by Jones (1979) to be primitive for the tribe.

A survey of leaf flavonoids of those taxa recognized in this treatment was carried out. Procedures used were those of Giannasi (1975). Unfortunately, the flavonoid survey was severely limited due to the fact that no living materials could be obtained and the number of herbarium specimens from which fragments could be removed was quite low. Only one sample each of *P. samanensis* and *P. rufescens* was available for analysis. Seven samples of *P. antillana* were available.

A total of twenty-two compounds were separated as discrete spots on paper chromatograms. Most of these, however, were present only in very low quantities. The combination of lack of materials and low concentrations of most flavonoids resulted in only four of the twenty-two compounds present being tentatively identified. All four were quercetin compounds. Harborne and Williams (1977) had previously reported the occurrence of unspecified flavonols in two taxa of *Piptocoma*.

Piptocoma rufescens and *P. antillana* are very similar in their flavonoid profiles although *P. antillana* exhibits variation in its minor constituents. *Piptocoma samanensis* exhibits a reduced flavonoid profile.

Obviously no broad conclusions can be reached from what little flavonoid data is available at this time. Spectral data, R_f values, color reactions, and tentative identities of the various compounds are recorded in Tables 1, 2 and 3. Composite chromatograms for the various taxa are given in Figure 2.

Based on the results of this study three taxa are recognized within the genus *Piptocoma: P. rufescens, P. antillana,* and *P. samanensis*.

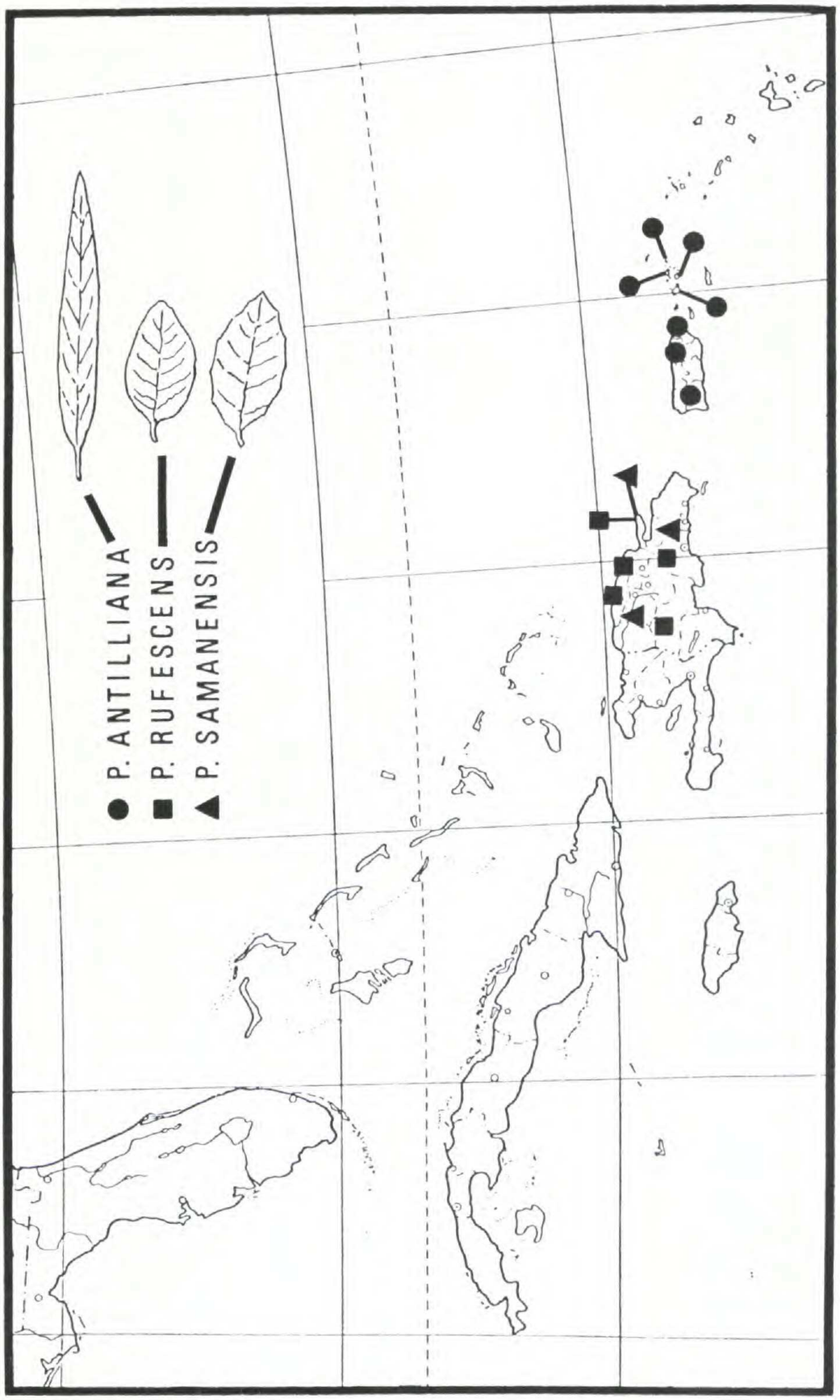

Figure 1. Distribution of *Piptocoma.* Circles = *P. antillana;* squares = *P. rufescens;* triangles = *P. samanensis.*

Table 1. R_f Values, Color Properties, and Tentative Identities of Leaf Flavonoids of Piptocoma

Spot No.	Identity	R_f Values		Color	
		TBA	HOAc	UV	UV+NH_3
1	Quercetin-3-0-methyl ether	.78	.28	P	Y
2	unknown	.82	.27	P	Y
3	unknown	.74	.09	P	Y
3b	unknown	.71	.05	P	Y
4	Quercetin	.57	.04	Y	Y
4a	unknown	.58	.06	Y	Y
5	Quercetin-3-0-glucoside	.55	.53	P	Y
6	Quercetin-3-0-glycoside	.55	.31	P	Y
7	unknown	.26	.20	P	Y
8	unknown	.33	.12	Y	Y
9	unknown	.29	.22	Y	Y
10	unknown	.24	.16	Y	Y
11	unknown	.17	.12	Y	Y
12	unknown	.16	.75	P	Y
13	unknown	.29	.50	P	Y
14	unknown	.39	.06	P	Y
15	unknown	.29	.71	P	Y
16	unknown	.78	.08	Y	Y
17	unknown	.33	.39	P	Y
18	unknown	.39	.34	P	Y
19	unknown	.22	.66	P	Y
20	unknown	.55	.24	P	Y

TAXONOMIC TREATMENT

Piptocoma Cass., Bull. Soc. Philom. Paris Ser. 3. **4:** 10. 1817.

Shrubs, usually diffusely branched, young stems tomentose. Leaves alternate, petiolate; blades oval to lanceolate, rounded to acuminate at the apex, cuneate to cordate at the base, becoming glabous above, stellate-tomentose below, punctate-glandular both above and below, margins entire to subangular and toothed. Inflorescences terminal, corymbose or glomerate, of 6–many heads. Heads with 4–12 florets, pedunculate or sessile; involucres more or less cylindric, 3.5–8.5 mm long, 2–5 mm wide; phyllaries imbricate, in 4–6 series, rounded at the apex; receptacle flat to subconvex, naked. Corollas tubular, 5-lobed, reddish-purple, 5–8 mm long, lobes glandular-dotted; stamens 5, anthers basally sagittate; style branches slender. Pappus biseriate, straw-colored; inner series of 10–15 bristles; outer series of ca. 10 distinct to partially united pales 0.5–1.8

Table 2. Spectral Data for Piptocoma Leaf Flavonoids.

Spot No.	MeOH	+$AlCl_3$	+$AlCl_3$/HCl	+NaOMe	+NaOAc	+NaOAc/H_3BO_3
1	*352*	*428*	*390*	*408*	*384*	425s
	266s	273	363	*269*	*267*	*370*
	252		295s			*264*
			273s			
			262			
4	*372*	*455*	*427*	DEC.	*394*	460s
	292	320s	362		333	*380*
	255	*272*	295s		274	287
			263			273s
						263
4a	*348*	*432*	403s	N.A.	*385*	435s
	268s	325s	*360*		305s	*360*
	258s	*270*	300			303s
		278s				
5	*360*	*437*	*405*	*414*	*394*	450s
	303s	329	366	320	325	*378*
	257	303s	298s	*273*	*274*	296s
		274	*270*			*261*
6	350s	*438*	*399*	*398*	*382*	*355*
	340	357	335	*275*	*270*	
	298s	305s	298s			
	270s	*274*	*270*			
	255					

DEC. = decomposed; N.A. = not available; s = shoulder or inflection

mm long. Achenes obconic, 5-angled, glabrous, 2–5 mm long, 0.7–1.7 mm wide, length/width ratio (1.7) 2–4 (4.2). TYPE SPECIES; *Piptocoma rufescens* Cass.

KEY TO THE SPECIES OF PIPTOCOMA

a. Inflorescences glomerate; leaf margins subangular and toothed. ..... 1. *P. samanensis*

a. Inflorescences corymbose; leaf margins entire ..... b.

b. Length/width ratio of mature achenes (2.8)3–4(4.2); heads with (6)10(12) florets; leaf blades oval to elliptic, length/width ratio (1.2)2.1(3.2); Hispaniola ... 2. *P. rufescens*

b. Length/width ratio of mature achenes (1.7)2–2.5(2.7), heads with (4)6(7) florets; leaf blades lanceolate to elliptic, length/width ratio (2)3.6(6); Puerto Rico and adjacent Virgin Islands ..... 3. *P. antillana*

1. **Piptocoma samanensis** Liogier, Brittonia **20:** 153. 1968. TYPE: DOMINICAN REPUBLIC: Peninsula de Samana, Pan de Azucar, *Ekman 15847* (HOLOTYPE NY!; Isotypes F!, GH!, K!, S!, US!).

Piptocoma dentata Liogier, Mem. New York Bot. Gard. **21:** 153. 1971. TYPE: DOMINICAN REPUBLIC: Puerto Plata, Loma del Puerto, *Liogier 15546* (Holotype NY!; Isotypes GH, IJ, P, US).

Piptocoma subscandens Urban & Ekman, nomen nudum.

Shrub, up to 3 m tall. Petioles ca. 4 mm long; leaf blades elliptic to oval, 2.5–5.5 cm long, 1–3.2 cm wide, length/width ratio 1.5–2, more or less acute at the apex, cuneate to rounded at the base, margins subangular and toothed with 1–2 teeth per cm. Inflorescences glomerate, of 6–18 heads. Heads with (5)10(12) florets, sessile; involucres 6–8 mm long, 2–5 mm wide. Corollas 5–7 mm long. Inner pappus of 10–15 bristles, 3.5–5 mm long; outer pappus 0.5–1.2 mm long. Achenes 3.5–5 mm long, 1.2–1.7 mm wide, length/width ratio (2.5)3–3.5(3.8).

This species is known to occur only on the island of Hispaniola being found most often on exposed sites in rocky, calcareous soil. Flowering and fruiting occur from June to August.

Representative specimens: DOMINICAN REPUBLIC: Peninsula de Samana, Pan de Azucar, *Ekman 14878* (F, GH, K, S). Loma del Puerto, Pedro Garcia, *Liogier 15067* (GH, NY, P, US). Los Haitises, Pilancon, Bayaguana, *Liogier & Liogier 18877* (NY).

2. **Piptocoma rufescens** Cass., Bull. Soc. Philom. Paris Ser. 3. **5:** 58. 1818. TYPE: HISPANIOLA: *Desportes s.n.* (Holotype P).

Eupatorium domingense Spreng., Systema Vegetabilium, Ed. 16 (=Ed. 17) 3: 412. 1825. TYPE: HISPANIOLA: *Bertero 731* (Holotype P).

Oliganthes rufescens (Cass.) Sch.-Bip., Pollichia **20–21**: 338–339. 1863.

Piptocoma ekmanii Liogier, Mem. New York Bot. Gard. **21:** 153–154. 1971. TYPE: DOMINICAN REPUBLIC: Puerto Plata, Arroyo Frances, *Ekman 14393* (Holotype NY!; Isotypes B!, F!, G!, GH!, K!, S!).

Shrub, up to 3 m tall. Petioles 3–7 mm long; leaf blades oval to elliptic, 2–10.5 cm long, 1.5–5.6 cm wide, length/width ratio (1.2)2.1(3.2), rounded to acute at the apex, rounded to cordate at the base, margins entire. Inflorescences densely corymbose, of numerous heads. Heads with (6)10(12) florets, pedunculate, involucres 5–8.5 mm long, 2–4 mm wide. Corollas ca. 7.5 mm long. Inner pappus of ca. 10 bristles, 2.7–4.2 mm long; outer pappus 0.7–1.8 mm long. Achenes 2–4.5 mm long, 0.7–1.4 mm wide, length/ width ratio (2.8)3–4(4.2).

Table 3. Distribution of Leaf Flavonoids in Piptocoma.

Taxon/sample	Compound No.																					
	1	2	3	3b	4	4a	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
P. samanensis:																						
Ekman 14878	X	X	X	X	X	X	X		X					X		X						X
P. rufescens:																						
Ekman 14910	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X						
P. antillana:																						
Robertson 22	X	X			X	X	X	T		X			X	X	X		X					
Britton 273	X	X			X	X	X	X		X			T	T			T					
Fishlock 10	X	X	X		X	X	X		X	X			T	X			T		T	T	T	
Wagner 855	X	X			X	X	X	X		X			T		T		T					
Eggers 397	X	X			X	X	X			X		X	X	X	X							X
Heller 1177	X	X			X	X	X	X		X		X	X	X	T							
Liogier 9878	X	X			X	X	X	X		X			X	T				X					

T = present in trace amounts only.

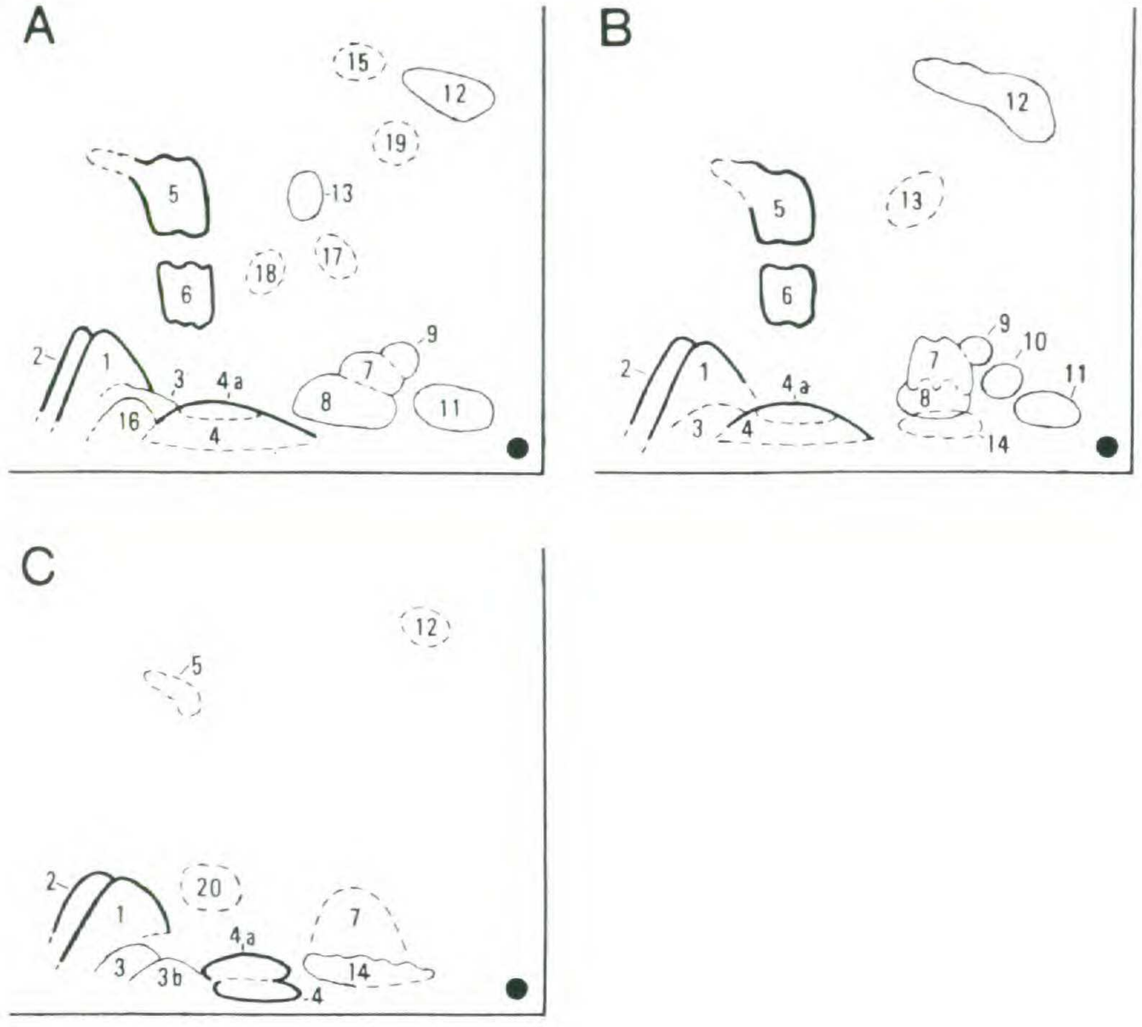

Figure 2. Composite chromatograms of *Piptocoma* leaf flavonoids. A = *P. antillana*; B = *P. rufescens;* C = *P. samanensis.* Heavy lines denote major components. Dashed lines denote trace compounds.

This species is known to occur only on the Island of Hispaniola, being found on serpentine hills. Flowering and fruiting occur from March to December.

Representative specimens: HAITI: Depto. du Nord, Grande Ville, Morne Bois Pin, *Ekman 2895* (F, GH, K, NY, S, US). DOMINICAN REPUBLIC: Peninsula de Samana, Cabo Samana, *Ekman 14910* (B, S, US). Gaspar Hernandez, *Liogier 16522* (F, GH, NY, US). Sierra Prieta, *Liogier 17396* (NY, US).

3. **Piptocoma antillana** Urban, Ark. Bot., Band 23A, **11:** 50–51. 1931.
TYPE: ST. THOMAS: Water Island, *Eggers & Toepffer 475* (Holotype B; Isotypes G!, GH!, M!).

Piptocoma rufescens Cass. var. *latifolia* Gl., Bull. Torrey Bot. Club **46**: 251. 1919.
TYPE: ST. THOMAS: Water Island, *Britton, Britton, & Shafer 104* (Holotype NY!; Isotype US!).

Shrub, up to 2.5 m tall. petioles 3–8 mm long; leaf blades lanceolate to elliptic, 2.5–9 cm long, 0.9–3 cm wide, length/width ratio (2)3.6(6), acuminate to rounded at the apex, cuneate at the base, margins entire. Inflorescence corymbose, of numerous heads. Heads with (4)6(7) florets, pedunculate; involucres 3.5–6 mm long, 2–4 mm wide. Corollas ca. 8 mm long. Inner pappus of ca. 10 bristles, 2.7–6 mm long; outer pappus 0.5–1.2 mm long. Achenes 2.4–3.5 mm long, 0.9–1.2 mm wide, length/width ratio (1.7) 2–2.5(2.7).

This species occurs on Puerto Rico and adjacent Virgin Islands being found in coastal thickets and similar areas. Flowering and fruiting occur from March to December.

Representative specimens: PUERTO RICO: Cabosa de San Juan, *Sintenis 1899* (BM, F, K, M, NY, S, US). Fajardo, Las Croabas lighthouse, *Wagner 1613* (BM, GH). ST. THOMAS: Water Island, area of the sound, *D'Arcy 376* (BM). ST. JOHN: Coral Bay, *Raunkiaer 1916* (MO, S, US). TORTOLA: Salt Island, *Britton & Shafer 845* (F, K, NY, US). VIRGIN GORDA: North Sound, *Fishlock 10* (NY, US).

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